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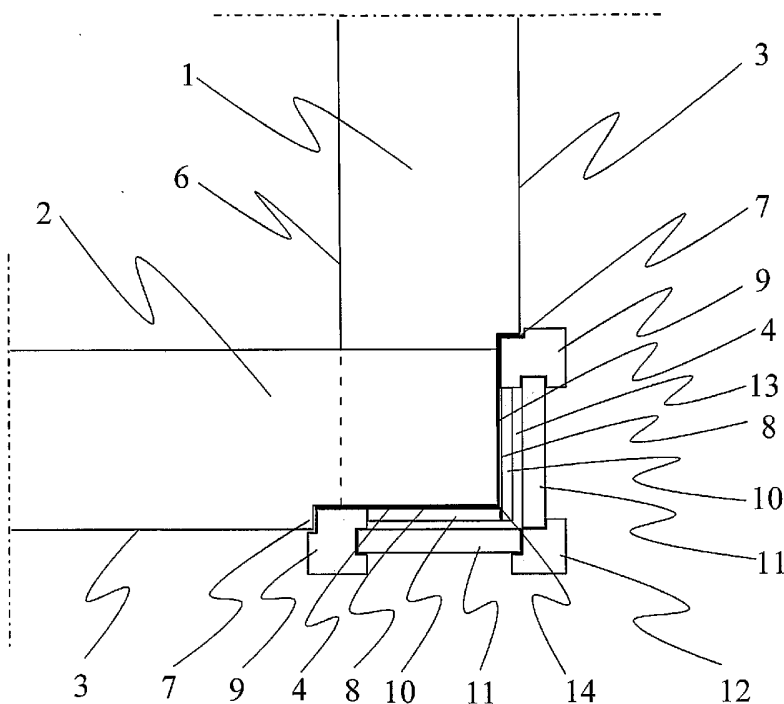
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(54) Title: AIRTIGHT LOG CORNER STRUCTURE



(57) Abstract: The invention relates to a short-corner structure of a log building, in which the logs of the first wall (1) and the logs of the second wall (2) are fastened to each other by means of a corner joint. The corner joint is preferably a locking joint, which interlocks the ends of the logs as immobile in relation to each other. The short-corner structure is covered from the outside by vertical corner boards (11) installed on the corner. The basic idea of the invention is that at least one layer of windstop material (8, 10) is arranged on the corner area, with the purpose of improving the airtightness of the short-corner structure. The windstop material is fastened on the exterior surface of the log in a way that in the complete structure it remains invisible under the corner boards. The windstop material to be used is preferably windproof paper and/or windproof board. Advantageously, an end thinning (4) is cut on the exterior surfaces of

the log ends so that the distance of the edge (7) of the end thinning from the outer corner (14) is larger than the width of the log at the end thinning. A corner batten (9) is fastened at the edge of the end thinning, and the edges of the windproof paper are extended under the corner battens. A ventilation gap (13) is arranged between the windstop material and the corner board.

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Airtight log corner structure

The invention relates to a short-corner structure of a log building, in which the logs of the first wall and the logs of the second wall are fastened to each other at the corner, and in which the short-corner structure is covered by corner boards.

- 5 Log construction is a traditional method of building wooden houses. At the corners of log buildings, the logs of the walls intersect each other, forming a corner joint. There are two different basic types of corner joints. In the type of corner joint, which is most commonly used, the end of the log continues as "long" past the point of the joint, whereby an overhang holding the corner joint together is formed
- 10 in the part of the log that extends past the corner. The end of the log also protects the joint from the strain of the weather, such as wind and rain. The other basic type of corner joints is the so-called "short corner", in which the ends of the logs reach to the same level as the exterior surfaces of the walls at the corners or only a little over them. Short-corner joints are often covered by corner boards.
- 15 Uncontrolled air leakage taking place through the corner joints is a known problem in log buildings. The problem is especially pronounced in short-corner joints, where there is no "overhanging" part of the corner to protect the corner joint. Uncontrolled air leakage through the corners impairs the energy economy of a log building and increases heating costs. The poor airtightness of log buildings partly
- 20 accounts for the fact that expensive additional insulation is required for making the heat insulation level of log buildings to comply with the regulations. Air leakage also impairs the operation of ventilation equipment and makes it more difficult to achieve controlled ventilation in the interior of the building. Air leakages also cause a sense of draught to the inhabitants and thus weaken the comfort of living.
- 25 It is known to cover the exterior of the log building entirely by boarding. In this connection, it is possible to install a continuous layer of windstop material on the exterior of the log building under the boarding, which layer can also reach to the area of the corners. The layer of windstop material installed in connection with the boarding is not especially intended to improve the airtightness of the corners, but it
- 30 is routinely installed on the whole wall surface. Boarding is very seldomly used in log houses, because it changes the characteristic appearance of a log building significantly.

The publication US 20020157334 discloses a building method in which log-like elements built up of lamellas glued together are used. The ends of the elements

are connected to each other by an elongated corner piece made of steel, which is used in the corner joints of the building. The corner structure is covered by corner boards on the outside. Because the windstop materials used in wooden buildings must be highly permeable to water vapor, it is clear that the steel corner piece described in the publication is intended merely as a joining piece of the elements, and it is thus not intended to function as a windstop layer to improve the airtightness of the corner.

It is an objective of the invention to disclose an improved short-corner structure of a log building, by which the drawbacks and disadvantages of the prior art short-corner structures can be significantly reduced.

The objectives of the invention are achieved by a short-corner structure of a log building, which is characterized in what is set forth in the independent claim. Some preferred embodiments of the invention are set forth in the dependent claims.

The invention relates to a short-corner structure of a log building, in which the logs of the first wall and the logs of the second wall are fastened to each other by a corner joint, forming thus the corner of the building. The corner joint is preferably a locking joint, which interlocks the ends of the logs as immobile in relation to each other. The short-corner structure is covered from the outside by vertical corner boards installed on the corner, the primary task of which is to protect the ends of the logs from the strain of the weather and to prevent the access of water and wind to the gaps and seams of the corner joint structure. The basic idea of the invention is that at least one layer of windstop material is arranged on the corner area, with the purpose of improving the airtightness of the short-corner structure. The windstop material is fastened to the exterior surface of the log so that in the complete structure it remains invisible under the corner boards. The windstop material to be used is preferably windproof paper and windproof board.

In an advantageous embodiment of the invention, an end thinning is cut on the outer surfaces of the ends of the logs. The distance of the edge of the end thinning from the outer corner is larger than the width of the log at the end thinning.

In another advantageous embodiment of the invention, the corner structure comprises a corner batten fastened at the edge of the end thinning, and the edges of the windproof paper are extended under the corner battens.

In a third advantageous embodiment of the invention, there is a ventilation gap between the windstop material and the corner board.

An advantage of the invention is the fact that it improves the energy economy of log buildings significantly, which is seen as savings in the heating costs of the building.

Another advantage of the invention is the fact that it reduces the sense of draught
5 inside the building, which improves the comfort of living.

A further advantage of the invention is the fact that the ventilation systems of a log building work better, because uncontrolled air leakage is reduced.

Yet another advantage of the invention is the fact that for its part it helps to achieve the regulatory level of heat insulation and ventilation in log buildings.

10 In the following, the invention will be described in more detail. Reference will be made to the accompanying drawings, in which

Fig. 1 shows an example of a short-corner structure of a log building according to the invention as a sectional drawing, and

15 Figs. 2 to 5 show advantageous embodiments of a short-corner structure of a log building according to the invention as sectional drawings.

Fig. 1 presents an example of a short-corner structure of a log building according to the invention as a horizontal section. The log building is manufactured in the well-known manner from logs placed horizontally on top of each other. At the corners of the walls, where the logs intersect, notches are cut at the ends of the logs
20 to form the corner joint by which the logs are connected to each other. In the invention, the logs of the first wall 1 and the logs of the second wall 2 are connected to each other by a locking joint known as such so that a corner joint shown by the drawing is formed.

25 End thinnings 4 have been made on the outer surfaces of the ends of the logs in the area of the short-corner structure so that the plane of the end thinning is essentially parallel with the plane of the exterior surface of the logs. The depth of the end thinning can be selected suitably, preferably the depth of the end thinning is 2-3 cm. The width of the end thinning as measured from the end surfaces of the logs is slightly larger than the width of the logs, i.e. the edge 7 of the end thinning
30 is further from the outer corner 14 than the plane of the inner surface 6 of the logs. The joint created on the side of the inner surface of the log thus remains in the area of the end thinning. In the short-corner structure according to the invention,

the logs of the first wall 1 have been cut to such a length that the ends of the logs reach to the level of the end thinning 4 of the logs of the second wall. Correspondingly, the logs of the second wall 2 have been cut so that their ends reach to the level of the end thinning of the logs of the first wall. In that way, together with the
5 end thinnings, the end surfaces of the logs form planar exterior surfaces of the short-corner structure, which are essentially parallel with the exterior surfaces 3 of the logs. The corner joint is symmetrical, and so the difference between the levels of the exterior surfaces of the wall and the end surfaces of the logs is substantially the same on both walls.

10 The exterior surface of the short-corner structure according to the invention is entirely covered with windproof paper 8. The windproof paper extends as a continuous strip from the edge 7 of the end thinning 4 of the log of the first wall 1 over the outer corner 14 up to the edge of the end thinning on the log of the second wall 2. The windproof paper thus entirely covers the gaps and seams exposed at the exterior
15 surface of the short-corner structure, and thereby significantly improves the airtightness of the short-corner structure. The windproof paper is fastened to the logs at the edges by mechanical fastening means, preferably by rivets or staples, which are not shown in the figure. Vertical corner battens 9 of the wall are fastened to the edges of the end thinnings so that the edge of the windproof paper
20 remains pressed between the corner batten and the surface of the log. Reliable and airtight fastening of the edges of the windproof paper is ensured by the corner battens. The corner battens are fastened to the logs by mechanical fastening means, such as nails or screws. In addition, strips of windproof board 10 are installed on top of the windproof paper so that the windproof boards extend from the
25 edge of the corner batten up to the outer corner 14. The windproof paper thus becomes entirely covered by either the corner battens or the windproof board. The windproof boards are fastened to the logs by mechanical fastening means, such as nails, screws or staples.

The short-corner structure according to the invention is covered by vertical corner
30 boards 11, the first ends of which are fitted to a slot in the corner battens and the second ends are fastened to a corner bead 12 placed at the joining point. The corner boards and the corner bead are fastened in place by mechanical fastening means, such as nails, screws or staples. Between the corner boards and the windproof board there is a ventilation gap 13, from which there is a connection to
35 the outside air at both ends of the corner boards. Due to the ventilation gap, exchange of air takes place behind the corner boards, and therefore any humidity

possibly carried through the short-corner structure cannot accumulate behind the corner boards.

Some preferred embodiments of the short-corner structure of a log building according to the invention are shown in Figures 2 and 3. These embodiments differ
5 from the short-corner structure shown by Fig. 1 in that only one layer of windstop material is used in them. In the short-corner structure shown by Fig. 2, the layer of windstop material is windproof paper 8, which covers the whole exterior surface of the short-corner structure. The windproof paper is fastened to the wall logs at its edges by means of corner battens 9. In the embodiment shown by Fig. 3, the ex-
10 terior surfaces of the short-corner structure are covered by a windproof board 10, which extends from the outer corner 14 up to the edge 7 of the end thinning.

Fig. 4 presents yet another preferred embodiment of the short-corner structure of a log building according to the invention. In this embodiment, both a windproof paper 8 and a windproof board 10 are fastened to the exterior interface of the corner.
15 No corner battens are used in the corner, but the edges of the corner boards are extended over the edge 7 of the end thinning and fastened directly to the exterior surface of the log.

Fig. 5 presents still another preferred embodiment of the short-corner structure of a log building according to the invention. In this embodiment, the log ends of the
20 first wall extend by a few centimeters over the level of the exterior surface of the logs of the second wall. Correspondingly, the log ends of the second wall extend in the same way slightly over the level of the exterior surface of the logs of the first wall. However, the overhang is so small that it is clearly a short-corner structure. The exceeding over the end of the log is preferably about four centimeters. A
25 windproof paper is fastened to the exterior interface of the corner in a way that it covers, as a continuous layer, the ends of the logs joined at the corner and the gaps and seams between the logs exposed at the exterior surface of the corner structure. In this embodiment, the corner structure includes three corner battens 9, which are placed at the corners formed by the logs intersecting at the corner. The
30 edges of the windproof paper have been extended under the outermost corner battens 9 of the corner structure, and so the windproof paper remains well in place. The corner structure is covered by corner boards 11 in the known manner.

Some preferred embodiments of a short-corner structure of a log building according to the invention have been described above. The invention is not limited to the

solutions described above, but the inventive idea can be applied in numerous ways within the limits set by the claims.

Claims

1. A short-corner structure of a log building, in which the logs of the first wall (1) and the logs of the second wall (2) are fastened to each other at the corner, and which short-corner structure is covered by corner boards (11), **characterized** in that there is at least one layer of windproof material (8, 10) between the logs and the corner boards.
5
2. A short-corner structure according to Claim 1, **characterized** in that on the exterior surfaces (3) of the ends of the logs (1, 2) there is an end thinning (4), which ends at an edge (7), the distance of which from the outer corner (14) is larger than the width of the log at the end thinning.
10
3. A short-corner structure according to Claim 2, **characterized** in that the depth of the end thinning (4) is 2-3 cm.
4. A short-corner structure according to any one of the claims 1 to 3, **characterized** in that at least one layer of windproof material is of windproof paper (8).
- 15 5. A short-corner structure according to Claim 4, **characterized** in that it comprises corner battens (9) fastened at the edge (7) of the end thinning (4) or at the corners formed by the logs (1, 2) intersecting at the corner, and that the edges of the windproof paper (8) are extended under the corner battens.
- 20 6. A short-corner structure according to any one of the claims 1 to 5, **characterized** in that at least one layer of windproof material is of windproof board (10).
7. A short-corner structure according to Claim 6, **characterized** in that the windproof board (10) extends from the outer corner (14) to the edge of the corner batten (9).
- 25 8. A short-corner structure according to any one of the claims 1 to 7, **characterized** in that there is a ventilation gap (13) between the windproof material (8, 10) and the corner board (11).

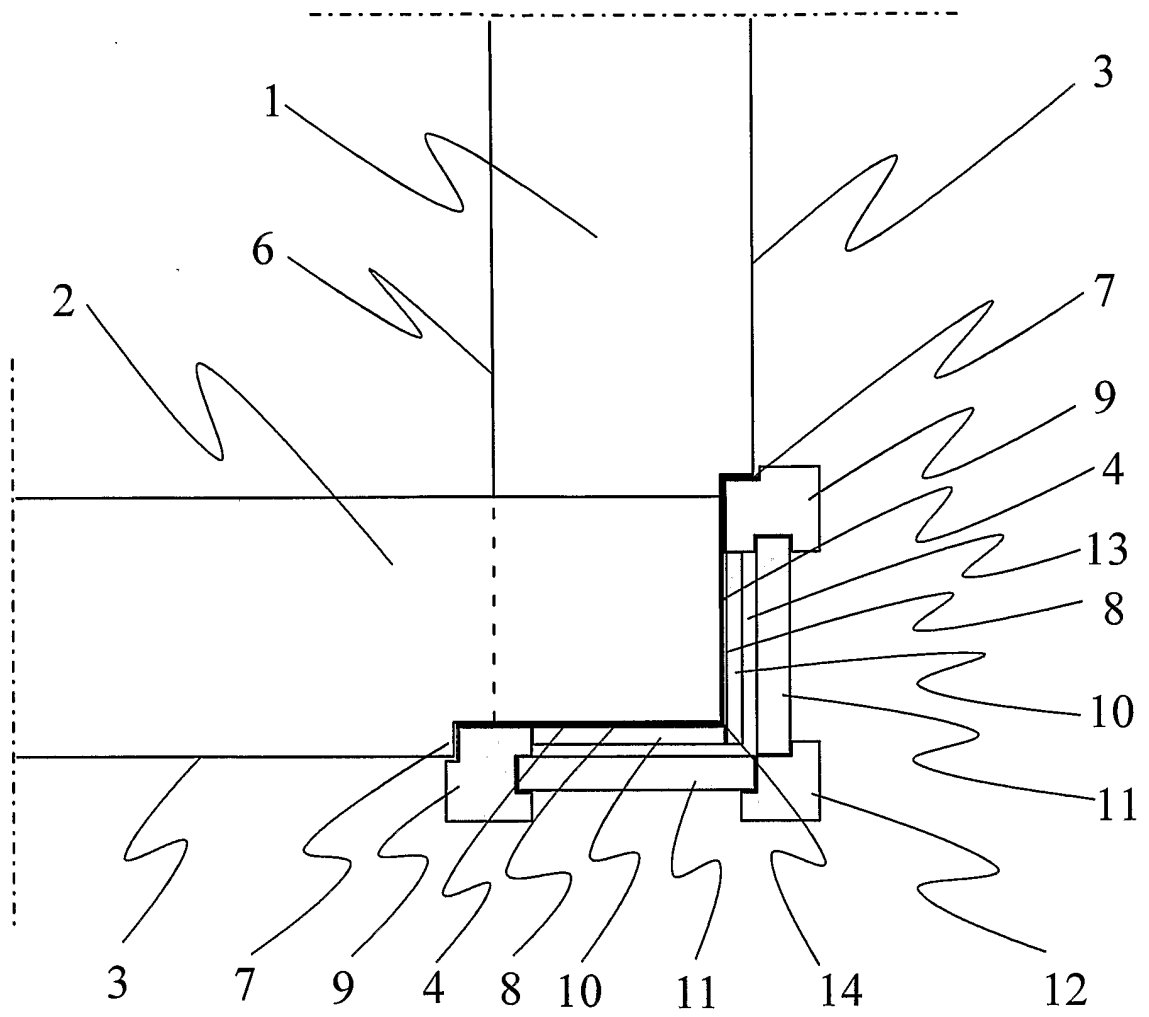


Fig. 1

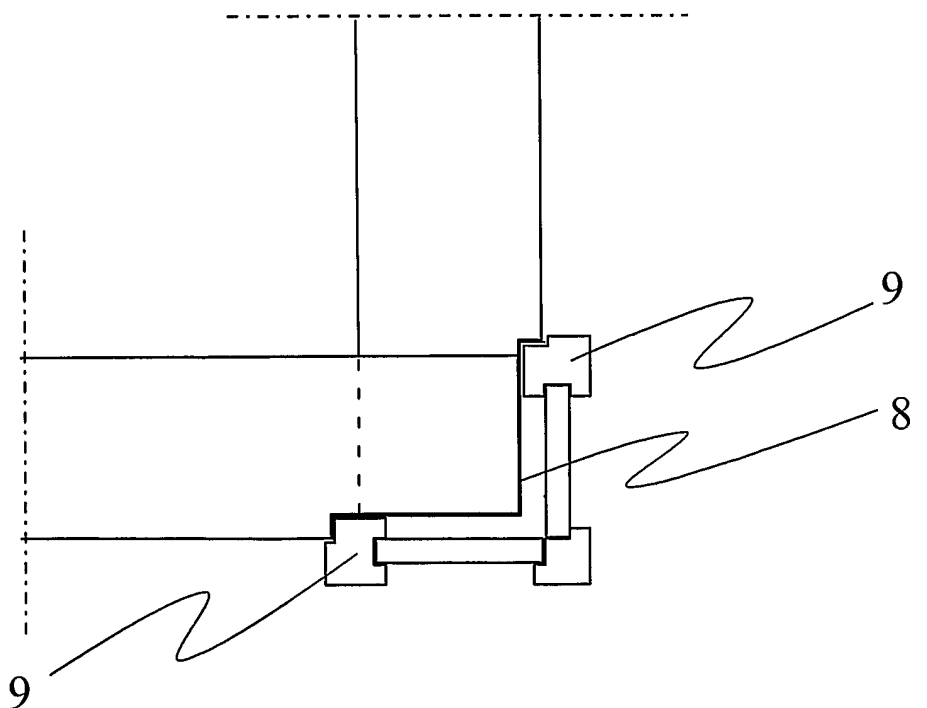


Fig. 2

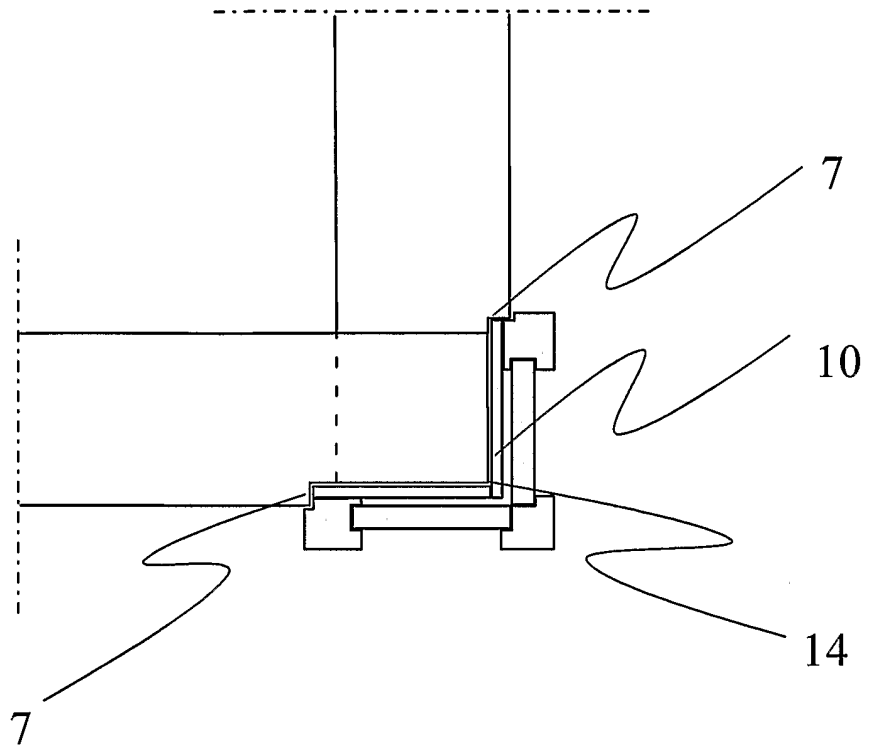


Fig. 3

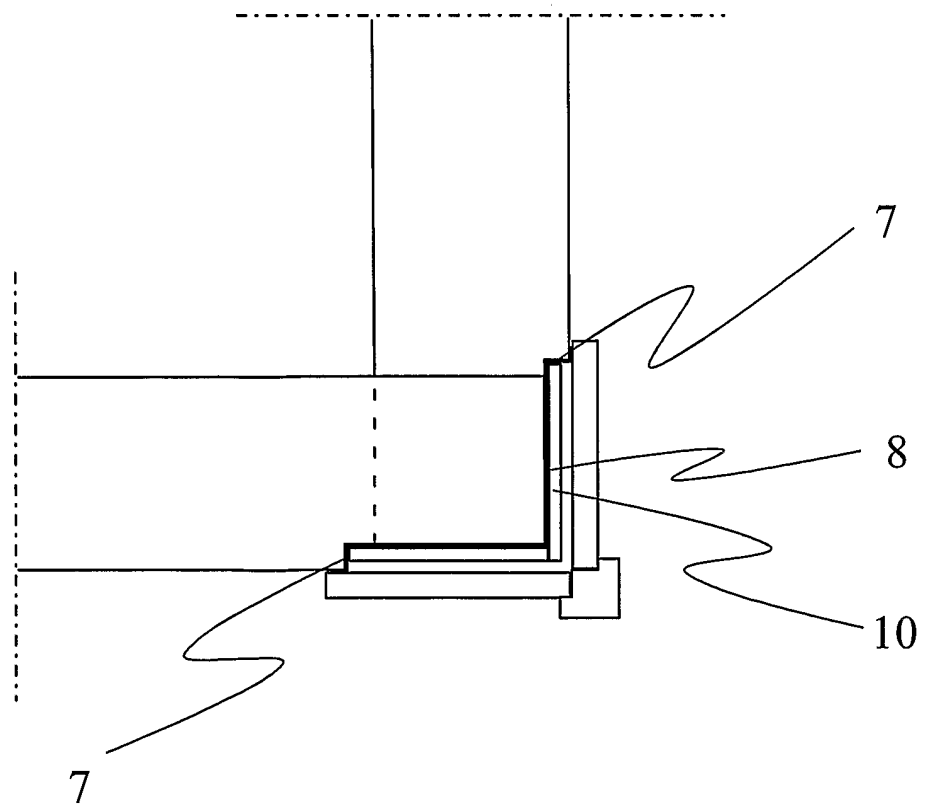


Fig. 4

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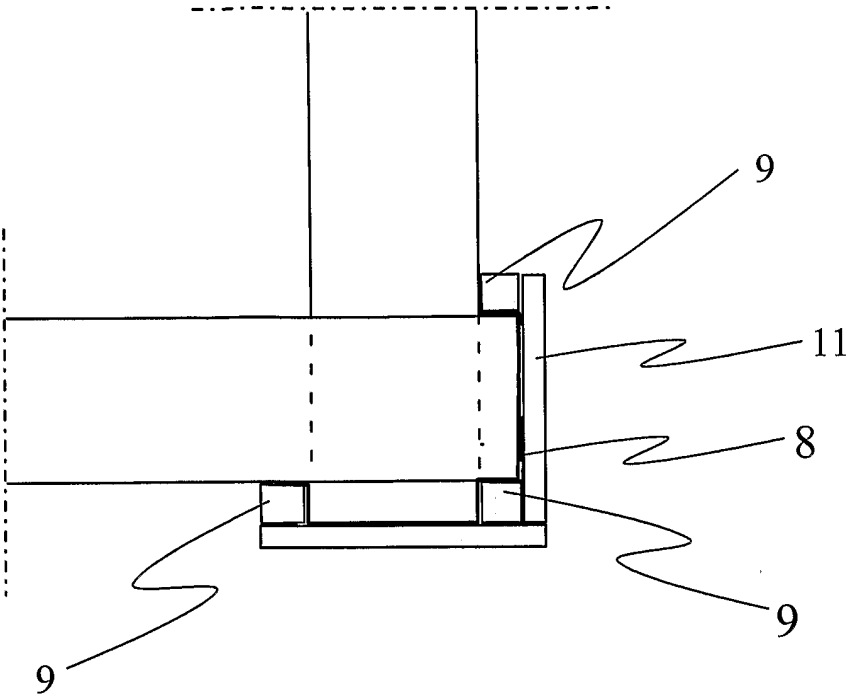


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI 2004/000729

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: E04B 2/70, E04B 1/70

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: E04B, E04C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3818653 A (A.C. WILLIAMS), 25 June 1974 (25.06.1974), column 2, line 34 - line 46; column 3, line 56 - column 4, line 10; column 4, line 52 - column 5, line 45, figures 1-9 --	1-3
A	US 2304034 A (E.T. SPENCER), 1 December 1942 (01.12.1942), page 1, column 2, line 4 - line 10; page 2, column 1, line 13 - line 40; page 2, column 1, line 68 - column 2, line 2, figures 1-3 --	1-8
A	US 3623288 A (S.L. HOROWITZ), 30 November 1971 (30.11.1971), column 1, line 11 - line 25; column 6, line 31 - column 7, line 52, figures 1-7 --	1-8

 Further documents are listed in the continuation of Box C.
 See patent family annex.

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PCT/FI 2004/000729

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 20020157334 A1 (W.H. SMITH), 31 October 2002 (31.10.2002), page 3, paragraph (0038), figures 11, 12 --	1-8
A	US 1655701 A (K.M. HYLAND ET AL), 10 January 1928 (10.01.1928), page 1, line 90 - page 2, line 16, figures 1-3 --	1-8
A	US 3521417 A (V.F. ONJUKKA), 21 July 1970 (21.07.1970), column 2, line 23 - line 50, figures 1-5 -----	1-8

INTERNATIONAL SEARCH REPORT

Information on patent family members

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